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IS 13350 (1992): Molybdenum rod [MTD 9: Lead, Zinc, Cadmium, Tin, Antimony and their Alloys]

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भारतीय मानक

मॉलिब्डेनम छड़ें – विशिष्टि

Indian Standard

MOLYBDENUM RODS — SPECIFICATION

UDC 669·28 - 422·2

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

February 1992

Price Group 1

Special Metals and Alloys Sectional Committee, MTD 27

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Special Metals and Alloys Sectional Committee had been approved by the Metallurgical Engineering Division Council.

Molybdenum rods are suitable for leads, hooks, supports and metal-to-glass seals in electron tubes.

It also finds application as electrodes for electrical resistance welding due to high wear resistance and long service life. It is also used for electrical contacts because of its high resistance to spark erosion and the electric arc.

This standard has been prepared as a guide to the manufacturers and the users of molybdenum rods. In the preparation of this standard, necessary assistance has been derived from ASTM : F-289-81 'Molybdenum wire and rod for electronic application' issued by the American Society for Testing and Materials (USA).

Physical properties in addition to those included under test requirements have also been furnished in Annex A for information only.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

MOLYBDENUM RODS – SPECIFICATION

1 SCOPE

This standard covers the requirements for molybdenum rods of diameter less than 25 mm for electronic application and general engineering purposes.

2 REFERENCE

The Indian Standard IS 1387 : 1967 'General requirements for supply of metallurgical materials (*first revision*)' is a necessary adjunct to this standard.

3 TERMINOLOGY

3.0 For the purpose of this standard, the following definition shall apply.

3.1 Rod

The term rod applies to all material over 0·51 mm in diameter, supplied in straight length.

4 SUPPLY OF MATERIAL

The general requirements relating to supply of this material shall conform to IS 1387 : 1967. The material shall be uniform in composition, cross section and structural conditions.

5 CHEMICAL COMPOSITION

All grades of rods shall be minimum 99·90 percent pure molybdenum. Dopants, such as sodium oxide, potassium oxide or silicon oxide shall be added in suitable percentage as agreed upon by manufacturer and user for imparting the desired properties in the molybdenum rods.

6 FINISH

6.1 Molybdenum rods shall be supplied in any of the sizes and finishes indicated in Table 1 and as stated in the order.

Table 1 Forms of Supply, Finishes and Sizes

Form (1)	Finish (2)	Size (3)
Rods	Black, cleaned or centreless-ground electropolished	Diameter over 0·51 mm

6.2 Lengths of Supply for Rods

Diameter over 0·51 mm —	The rods shall be supplied in lengths of 1 000 mm ± 5 mm unless otherwise stated in order.

6.3 Straightness

The deviation in straightness shall not be more than 3 mm for a length of 1 000 mm.

6.4 For black or cleaned rod in diameters over 0·51 mm, the tolerance shall be ± 3 percent of the specified diameter. For centreless-ground rod, the diameter shall meet the tolerances shown in Table 2.

Table 2 Tolerances on Diameter (Centreless-Ground Rod)

Diameter (1)	Tolerances, mm (2)
Over 0·510 to 1·539 including	± 0·025
Over 1·540 to 12·709 including	± 0·050
Over 12·710 to 25·400 including	± 0·074

7 FREEDOM FROM DEFECTS

The rods shall be smooth, free from twists, dents, swaging marks, scratches, die marks, cracks and other physical defects. The rods shall also be free from graphite grease, oil dirt, oxide, strains, scales and other surface defects.

8 MECHANICAL PROPERTIES

The tensile and ductility requirements of rod shall be as agreed to between to purchaser and the supplier. The tensile strength of 0·51 mm diameter rod shall be minimum 400 MPa (for information only).

9 SAMPLING FOR TESTS

9.1 One representative sample from a lot shall be taken for testing and chemical analysis. A lot shall consist of 5 tons or less of the same quality drawn to the same diameter and condition. If the lot consists of more than one heat, samples from each heat shall be tested.

9.2 Specific sampling procedure shall be as agreed to between the purchaser and the supplier.

10 REJECTION AND REHEARING

10.1 Materials that fails to conform to the requirements of this specification may be rejected. Rejection should be reported to the supplier promptly and in writing. In case of dissatisfaction with the results of the test, the supplier may make claim for rehearing.

10.2 When agreement on rejection is established the purchaser shall return the rejected material in a suitable container for shipping, using the original container, if possible, so that the rod may arrive at the supplier's plant in the same condition as it left.

11 PACKING AND MARKING

11.1 The material shall be suitably packed to avoid contamination, oxidation and damage during transit and storage. No dusty or linty material shall be used for padding.

11.2 Each container of rods shall be identified with the name of supplier, the lot number, size and quantity of material, date of manufacture, grade and finish.

11.3 Special marking and packing requirements shall be as agreed upon between the purchaser and the supplier.

11.4 The material may also be marked with the Standard Mark. The details are available with the Bureau of Indian Standards.

ANNEX A

(*Foreword*)

PHYSICAL PROPERTIES OF MOLYBDENUM ROD

(FOR INFORMATION ONLY)

Sl No.	Properties	Test Condition	Unit	Value
1.	Density	—	g/cm^3	10·2
2.	Melting Point	—	°C	2 610
3.	Atomic Mass	—	—	95·95
4.	Specific Heat	at 20°C	Cal/g.°C	$6{\cdot}0 \times 10^{-2}$
5.	Thermal Conductivity	at 20°C	Cal/cm	0·34
6.	Specific Electrical Resistance	at 20°C	$ohm\ mm^2/m$	0·052

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The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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